In the Claims:

Claim 1 (presently amended): A method of microwave assisted chemical analysis comprising,

providing a sample within a vessel,

heating said sample by microwave energy to volatilize at least a portion of said sample to establish a gas phase with the remainder of said sample being unvolatilized,

cooling said gas phase while continuing to heat said sample by said microwave energy, and

after removal of at least a portion of ~~at least one of~~ said gas phase ~~and~~ from said unvolatilized portion of said sample analyzing the unvolatilized portion of said sample to determine the composition of said unvolatilized portion of said sample to determine the composition of said unvolatilized portion.

Claim 2 (previously amended): The method of claim 1 including

employing a sample containing silicon, and

said unvolatilized portion including trace elements which were contained in said silicon containing sample.

Claim 3 (original): The method of claim 2 including

determining the identity and quantity of at least some of said trace elements.

Claim 4 (previously amended): The method of claim 1 including

performing said process in a closed vessel.

Claim 5 (original): The method of claim 1 including

withdrawing at least a portion of said gas phase from said vessel.

Claim 6 (previously amended): The method of claim 1 including

employing a vessel which has portions which are transparent to microwave energy.

Claim 7 (original): The method of claim 2 including

employing polycrystalline silicon as said sample.

Claim 8 (previously amended): The method of claim 2 including

employing a vessel with at least two compartments in communication with each other,

introducing a silicon containing sample and a first acid into a first compartment, and

introducing a second acid into a second compartment.

Claim 9 (original): The method of claim 8 including

employing nitric acid as said first acid, and

employing hydrofluoric acid as said second acid.

Claim 10 (previously amended): The method of claim 9 including

distilling said hydrofluoric acid out of said second compartment and into said first compartment, and

distilling SiF_4 out of said first compartment and into said second compartment.

Claim 11 (presently amended): The method of claim 1 including

employing microwave energy ~~energy~~ of a frequency of about 27 to 2450 megahertz.

Claim 12 (previously amended): The method of claim 11 including

employing a vessel composed of a fluoropolymer.

Claim 13 (original): The method of claim 1 including

said vessel having a unitary chamber.

Claim 14 (previously amended): The method of claim 1 including

during said heating process introducing additional sample into said vessel.

Claim 15 (previously amended): The method of claim 14 including

said process being a continuous process.

Claim 16 (original): The method of claim 1 including

employing a liquid as said sample.

Claim 17 (presently amended): The method of claim 8 including

during said process introducing additional ~~said~~ sample into said vessel.

Claim 18 (original): The method of claim 17 including

during said process withdrawing at least a portion of said gas phase from said vessel.

Claim 19 (original): The method of claim 2 including

effecting substantially complete retention in said unvolatilized portion of all of said trace elements.

Claims 20 through 42 (cancelled).